REMARKS

The Examiner has stated that claims 21-30 are allowable. Applicants gratefully acknowledge the Examiner's indication of allowable subject matter.

The Examiner stated claims 9, 10, 19 and 20 would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims. In response, Applicants have so amended claims 9 and 19.

The Examiner rejected claims 1-8 under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US 2003/0017675).

The Examiner rejected claims 11-18 under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US 2003/0017675) in view of Hieda et al. (US 5,998,821).

Applicants respectfully traverse the §103(a) rejections with the following arguments.

35 USC § 103 Rejections

The Examiner rejected claim 1 under 35 U.S.C §103 (a) stating that "Chen et al. disclose a method of fabricating a structure, comprising: forming a trench (204) in a substrate (200) (see Fig. 2C); depositing a first layer of polysilicon (216) on a surface of the substrate (200), the first layer of polysilicon (216) filling said trench (204) (see Fig. 2D); chemical-mechanical-polishing said first layer of polysilicon (216) at a first predetermined temperature to expose the surface of the substrate (see Fig. 2D and related text in Page 3, Paragraph [0028]); removing an upper portion of the first layer of polysilicon (216) from the trench (see Fig. 2E and related text in Page 3, Paragraph [0029]); depositing a second layer of polysilicon (224) on the surface of the substrate (200) (see Fig. 2G), the second layer of polysilicon (224) filling the trench; and chemical-mechanical-polishing the second layer of polysilicon at a predetermined second temperature to expose the surface of the substrate (200)(see Figs. 2C - 2G and related text in Page 2, Paragraph [0024] though Page 3, Paragraph [0031]).

Furthermore, the polishing temperature can be determined by routine optimization in order to control the uniformity of the CMP process.

Therefore, it would have been to one having ordinary skill in the art at the time of the invention is made to determine the polishing temperature since it has been held where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." See *In re Hoeschele,* 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); *Merck & Co. Inc. v. Biocraft Laboratories Inc.,* 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); *In re Kulling,* 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and *In re Geisler,* 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997). Furthermore, the specification contains no disclosure of either the critical nature of the

claimed polishing temperature or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. See *In re Woodruff,* 919, f.2d 1575, 1578, 16 USPQ2d, 1936 (Fed. Cir. 1990)."

First, Applicants contend that claim 1 is not obvious in view of Chen et al. because Chen et al. does not teach or suggest every feature of claim 1. As a first example, Chen et al. does not teach or suggest "said second temperature different from said first temperature." Applicants point out that Chen silent as to CMP temperature of either of the first or second CMP temperatures and thus cannot teach "said second temperature different from said first temperature" as Applicants claim 1 requires.

Second, Applicants respectfully contend that the disclosure as a whole does support the critical nature of the CMP polishing temperatures. In paragraph [0020] Applicants disclose that "Control of the thickness, and thus the resistance of buried strap 185 (see also FIG. 1) effects the performance of DRAM cell 100." Applicants then in FIGs. 3A through 3I and 4A through 4F and accompanying text show the effect of CMP temperature on controlling recess depth of the trench polysilicon. FIG. 8 shows a change in polysilicon dishing in angstroms to be roughly 10 times the change in temperature in degrees F (275 Angstroms different between 90°F and 120°F. In FIG. 7 and paragraph [0038] which states "the polysilicon recess depth can be shown to correlate [to] the degree of dishing of polysilicon filled trenches and the thickness of buried straps. See also in FIG. 5 and paragraph [0036] which states "...(the temperature of the first CMP is greater than the temperature of the second CMP process) also provides a more uniform distribution of thickness...". Thus the variable being controlled (CMP temperature at two different CMP steps) controls the parameter of resistance of a strap formed several steps after the

trench polysilicon steps. Thus small changes in CMP polishing temperature effect strap resistance and uniformity across an array of devices having straps.

Third, the Examiner has stated "it is not inventive to discover the optimum or workable ranges by routine experimentation." Applicants again point out that Chen silent as to CMP temperature. Further Applicants, in claim 1, are claiming the first and second temperatures are different and not specific temperatures. Applicants contend that the cited opinions deal with specific temperatures and dimensions and that without a teaching of specific temperature in Chen et al. and a specific temperature in Applicants claim 1, the cited opinions are not applicable.

Based on the preceding arguments, Applicants respectfully maintain that claim 1 is not unpatentable over Chen et al. and is in condition for allowance. Since claims 31-34 depend from claim 1, Applicants respectfully maintain that claims 31-34 are likewise in condition for allowance.

The Examiner rejected claim 11 under 35 U.S.C §103 (a) stating that "Chen et al. disclose a method of fabricating a structure, comprising: forming a trench (204) in a substrate (200) (see Fig. 2C); depositing a first layer of polysilicon (216) on a surface of the substrate (200), the first layer of polysilicon (216) filling said trench (204) (see Fig. 2D); chemical-mechanical-polishing said first layer of polysilicon (216) at a first predetermined temperature to expose the surface of the substrate (see Fig. 2D and related text in Page 3, Paragraph [0028]); the first polysilicon in the trench dished at first distance form the bottom surface; removing an upper portion of the first layer of polysilicon (216) from the trench (see Fig. 2E and related text in Page 3, Paragraph [0029]); depositing a second layer of polysilicon (224) on the surface of the substrate (200) (see Fig. 2G), the second layer of polysilicon (224) filling the trench; and

chemical-mechanical-polishing the second layer of polysilicon at a predetermined second temperature to expose the surface of the substrate (200), the second polysilicon layer in the trench dished into the trench at second distance and the first distance grater than the second distance (see Figs. 2C - 2G and related text in Page 2, Paragraph [0024] though Page 3, Paragraph [0031]).

However, Chen et al. do not specifically disclose the claimed CMP temperature range and plurality of trenches.

Hieda et al. disclose forming of array of trenches (see Fig. 2) and forming the fist polysilicon layer in the trenches dished from the bottom surface of the trench at a first distance; forming of a second polysilicon in the trenches over the fist polysilicon dished in the trenches at a second distance, wherein the first distance is greater than the second distance (see Figs. 2 _9B). Hieda et al. formation of array of trenches is desired to form the trench capacitor.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant(s) claimed invention was made to provide Chen et al. reference with array of trenches as taught by Hieda et al. because the trenches used to form trench capacitors.

Furthermore, the polishing temperature can be determined by routine optimization in order to control the uniformity of the CMP process."

First, Applicants believe the arguments presented *supra* with respect to claim 1 are applicable to claim 11.

Second Applicants respectfully maintain that the Examiners motivation to combine references to wit "to provide Chen et al. reference with array of trenches as taught by Hieda et al. because the trenches used to form trench capacitors" is not persuasive since Chen et al. is already making a trench capacitor."

Third, Applicants contend that claim 11, as amended, is not obvious in view of Chen et al. in view of Hieda et al. because Chen et al. in view of Hieda et al. does not teach or suggest every feature of claim 11.

As a first example, Chen et al. in view of Hieda et al. does not teach or suggest "said trenches dished into said trench a first distance from surface of said substrate by said chemical-mechanical-polishing of said first layer of polysilicon." As a second example, Chen et al. in view of Hieda et al. does not teach or suggest "said second layer of polysilicon in said trenches dished into said trench a second distance from surface of said substrate by said chemical-mechanical-polishing of said second layer of polysilicon."

Applicants point out that in Chen et. al. FIG. 2G, the first polysilicon 216 is not dished after CMP, but is recessed in FIG. 2E by "by dry or wet etching" (see Chen et al. paragraph [0029]. Applicants point out that in Chen et. al. FIG. 2G, the second polysilicon 224 is not dished after CMP, but is recessed in FIG. 2H by "by dry etching or wet etching" (see Chen et al. paragraph [0033].

Based on the preceding arguments, Applicants respectfully maintain that claim 11 is not unpatentable over Chen et al. in view of Hieda et al. and is in condition for allowance. Since claims 35-38 depend from claim 11, Applicants respectfully maintain that claims 35-38 are likewise in condition for allowance.

CONCLUSION

Based on the preceding arguments, Applicants respectfully believe that all pending claims and the entire application meet the acceptance criteria for allowance and therefore request favorable action. If Examiner believes that anything further would be helpful to place the application in better condition for allowance, Applicants invite the Examiner to contact the Applicants' representative at the telephone number listed below. The Director is hereby authorized to charge and/or credit Deposit Account 09-0456.

Respectfully submitted,
FOR: Brooks et al.

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